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From: Releford, Carol
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i Peter,

Here's a copy of the Translation that you requested. For S/N 09/902,064. A paper copy of this Translation along with your copy of the Patent is ready for pick-up in the Translation Branch.

Thanks,

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CONCRETE PAVEMENT WITH JOINTS BETWEEN THE PAVEMENT SECTIONS OF A ROAD
[Betonbelag mit Fugen zwischen Belagabschnitten einer Strasse]

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UNITED STATES PATENT AND TRADEMARK OFFICE
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Patent Claims

1. Concrete pavement with transverse joints alone, or with transverse and longitudinal joints between pavement sections of a road to compensate temperature-dependent changes in the length of the pavement sections, characterized in that the front sides of, respectively, adjacent pavement sections (10, 20, 30, 40) exhibit zigzag walls (21, 22, 34, 35) on , at least, a part of the thickness of the pavement (D, I) which extend at the distance (A, C, F, G) of a multiple width of the joints (11, 31), that the recess which is formed by this is filled with a synthetic resin mortar (23, 24) or synthetic resin-modified cement mortar up to the level of the pavement surface with the exception of the joint (11, 31), and that the joint (11, 31) itself is sealed with an elastic material.

2. Pavement, in accordance with Patent Claim 1, characterized in that the zigzag walls (34, 35) of abutting pavement sections (10, 20, 30) extend, at least, approximately parallel to one another.

3. Pavement, in accordance with Patent Claim 2, characterized in that, in newly constructed pavement sections (10, 20), the joints (11) are configured in a zigzag shape, and extend, at least, approximately, in the middle and parallel to the walls (21, 22).

4. Pavement, in accordance with Patent Claim 2, characterized in that, with repaired joints (31) in old road pavement sections (30, 40), the walls (34, 35) are configured zigzag-shaped, at least, to a lower depth (I) than the thickness of the road pavement sections (30, 40), and the joint penetrating the mortar (23, 24) is the continuation of the

original joint (31) between the existing pavement sections up to the pavement surface.

5. Pavement, in accordance with Patent Claim 4, characterized in that the zigzag-shaped walls (34, 35) of the pavement sections (30, 40) are set back into the abutting pavement sections (30, 40) on both sides of the original joint by, at least, approximately the same distances.

6. Pavement, in accordance with any of the Patent Claims 3 and 5, characterized in that the distance between the joint (11; 31) and the zigzag-shaped walls (21, 22, 34, 35) is in the range of 7 to 30 cm in a straight-extending joint (31), and of 30 cm on both sides of the joint in a zigzag-extending joint (11).

7. Pavement, in accordance with Patent Claim 6, characterized in that the straight-extending parts of the walls (21, 22; 34, 35) have a length (H) in the range of 70 cm.

8. Pavement, in accordance with Patent Claim 5, characterized in that the walls (34, 35) of the recesses broken into the old road pavement sections (30, 40) are, at least, 2 cm in height.

9. Process for producing a concrete pavement in accordance with Patent Claim 1, with pavement sections (10, 20) of newly poured concrete, characterized in that, prior to the pouring of the pavement sections (10, 20), a zigzag-shaped joint mold is set on the sub-base, and that the pavement sections (10, 20) are produced up to a portion of the overall thickness, that, then, a bilaterally zigzag-shaped strip is laid over the joint (11), and the pavement section is poured completely, that, after the pavement sections (10, 20) have hardened, the strip is removed, the

joint mold is set in again, and the recesses are filled out with a synthetic resin mortar, and that, finally, the joint mold is removed, and the joint (11) is filled out with elastic material.

10. Process, in accordance with Patent Claim 9, characterized in that the joint is filled out with a silicone or bitumen mass.

11. Process for producing a concrete pavement in accordance with Claim 1, with pavement sections of old concrete of an existing concrete pavement, characterized in that the two abutting pavement sections (30, 40) are cut in, at least, approximately equal distances on both sides of the joint in a zigzag shape, that the pavement is stocked off and cleaned out between the cut and the joint, that a joint insert is set on the old joint which remains in the lower part which, at least, reaches up to the height of the pavement surface, that, then, the cleaned out parts of the pavement sections are cleaned with synthetic resin mortar, and that, after the synthetic resin mortar has hardened, the joint insert is removed, and the newly formed joint is filled out with an elastic material.

12. Process, in accordance with Patent Claim 11, characterized in that the cut into the pavement sections occurs by boring holes in the future corners of the zigzag-shaped front wall parts and the subsequent cutting by means of a separating disc.

The present invention relates to a concrete pavement with joints between the pavement sections of a road in accordance with the preamble of the independent Patent Claim 1. Furthermore, the invention relates to a process for producing a concrete pavement in accordance with the preamble of the independent Patent Claim 9 with pavement sections of newly

poured concrete and a process for producing a concrete pavement in accordance with the preamble of the independent Patent Claim 11 with pavement sections of old concrete of an existing concrete pavement.

Concrete roads are usually poured in sections and the individual sections are segregated from each other by joints. Such joints serve to compensate for temperature-dependent changes in the length of the pavement sections. These joints are tightly sealed without substantially affecting the flexibility of the concrete parts, in order to prevent the penetration of moisture which would attack the concrete reinforcement and/or which could freeze in winter and destroy the concrete parts. For this purpose, the approach which is known to the art is to pour resilient synthetic resin compounds or bitumen into the joints. These joints may range in size from 1 cm, and, in areas with extreme ground temperatures, they could be up to 2 cm in width.

Especially in concrete roads which are exposed to severe stress, for instance, due to the effect of steel crawler type undercarriages of tanks, it can be noticed in the joints that the concrete soon splits off or breaks off. Because the joint sealing material cannot fill out these defective spots, such a sealant has to be poured retroactively, in order to keep the joints sealed.

So far, such damaged joints have been repaired by cutting out the whole defective part of the concrete and by filling out the recess formed in this manner, either with concrete or with a synthetic resin mortar.

The disadvantage of such a repaired spot is that the transitional spots from the new concrete or plastic material to the old existing concrete

are exposed to the same impacts and damages, and that, aside from the restored joint, the transitional areas between the repaired part and the old part can also be damaged.

In CH-A 518410, a method for repairing a defective spot in a concrete road is described. According to it, a layer with a certain layer thickness is to be cut out and this recess is to be filled with a prefabricated block which is kept in place by means of an adhesive. This approach is to facilitate the rapid repair of defective spots. On the other hand, fractured joints cannot be repaired along their entire length because such large prefabricated blocks are cumbersome to handle and, therefore, are inappropriate for these types of repairs for that reason alone.

It is the objective of the invention to create a road pavement with joints which will result in an improved transition between road sections in such a way that the edges of the joints are not destroyed by vehicle impact. The joints themselves, however, are to facilitate a restoration of existing joints of road pavements.

In accordance with the invention, this is realized in accordance with the characterizing features in the characterizing part of the independent Patent Claim 1. A first method for producing a new road pavement is characterized in the independent Patent Claim 9, and a second method for repairing joints in existing road pavements for producing a road pavement in accordance with the invention is characterized in the independent Patent Claim 11.

In the following text, configuration examples of the invention will be described. In the drawing, the following is shown:

Figure 1, a ground outline of a joint in a newly prepared road pavement,

Figure 2, a sectional view in accordance with section line II-II in Fig. 1,

Figure 3, a ground outline of a joint in the restoration of a road pavement,

Figure 4, a sectional view in accordance with the section line IV-IV in Fig. 3.

With a new construction of concrete pavements, Figs. 1 and 2 show the configuration and arrangement of a joint between two abutting pavement sections (10, 20). The procedure for the formation of the joint (11) is as follows. First, a zigzag-shaped joint (11a) is spared in the base part (10a, 20a) of the concrete pavement by inserting a separating material in the manner known to the art. When the top part (10b, 20b) of the concrete pavement is poured, an area in the range of 30 cm is spared on both sides of the separating material, respectively, by laying a zigzag-shaped profile of the desired thickness, preferably, of more than 2 cm, on the base parts (10a, 20a). The top part (10b, 20b) of the concrete pavement is poured finished on it. After the concrete solidifies, the profiles are removed, and the formed recesses with the walls (21, 22) are filled out with a synthetic resin mortar (23, 24) on both sides of the separating material. After the synthetic resin mortar (23, 24) has hardened, the separating material is removed, e.g., by milling it out, and, finally, the joint (11) is poured by means of a silicone-containing compound, or a bitumen compound, in the manner known to the art.

Due to the zigzag-shaped course of the joint (11), what is realized, is, that, when a vehicle's wheel, or similar, rolls over the joint, no abrupt change of load occurs, but that the load gradually changes over from one section of the pavement to another one. The same also applies for the zigzag-shaped course between the concrete parts (10, 20) and the plastic parts (23, 24). If the ends between the straight-running parts on the front wall of the concrete are rounded, crack-causing sharp edges can also be avoided.

To restore defective pavement joints (Figs. 3 and 4), the existing straight joint (31) is left unchanged. In a zigzag-shaped arrangement, bores (32, 33) are drilled into the pavement sections (30, 40) on both sides of the joint (31), and, then, a notch (34, 35) is cut between the bores on each side of the joint. In the area between these milled out notches and the joint, the defective concrete is stocked off and cleaned.

The projecting edges of the zigzag line near the bores (33) are rounded to avoid sharp edges.

A border strip is inserted into the existing joint (31), and the recesses on both sides of the border strips are filled out with synthetic resin mortar, and the transitions to the concrete pavement sections (30, 40) are leveled off. To remove the border strip after the synthetic resin mortar has hardened, e.g., by milling it out, the joint can be poured with silicone or a bitumen compound.

Because the synthetic resin for the formation of the synthetic resin mortar can be obtained with various properties, such as high impact resistance, a resistant joint can thereby be formed which will meet the

necessary requirements although the joint also takes an otherwise unsuitable straight course. A fracturing out of the transition point between the synthetic resin mortar and the old concrete is virtually impossible for the same reasons that have already been described above.

The following compound has proved to be advantageous for the use as a synthetic resin mortar:

In new production:

A = C = 30 cm, B = 70 cm, and D > 2 m, E = 0.6 - 1 cm

In restoration:

F = 30 cm, G = 7 cm, H = 70 cm, I > 2 cm, K = 0.6 - 1 cm.

This compound has a reference to crawler-type undercarriage vehicles, so that, with road pavements in accordance with the invention, the joint is also appropriate for roads on which tanks travel because, due to the joint or impact point between the concrete and the synthetic resin mortar which extends at a sharp angle to the direction of travel, the enormous impacts of the steel crawler-type undercarriages can also not destroy the concrete edges. Because, in the restoration of roads, the synthetic resin mortar can be adapted to the existing surfaces on both sides of the joint, a high level of comfort results for motor ways when they roll over the joints.

In the previously described configuration examples, synthetic resin mortar was mentioned as a material in the transitional area between the joint and the concrete section. Of course, a synthetic resin-modified cement mortar can also be employed.

